

EASTMAN

Eastman EastaPure™
electronic chemicals

DE solvent

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Formula: $C_6H_{14}O_3$

Chemicals for the electronics industry

Eastman EastaPure™ DE Solvent is the 9th product to be included in our current line of EastaPure™ products. EastaPure™ DE solvent is a very polar, slow evaporating, water-miscible solvent with a mild odor providing low trace metals content for sensitive electronic applications. It is an active solvent for epoxy resins, cellulose acetate butyrate, nitrocellulose, and other resin and polymeric materials. High-purity specifications (low trace metals) are required for solvents in semiconductor chip manufacturing, and special handling and storage procedures are used to maintain the high-purity specifications. EastaPure™ DE is being presented for photoresist applications/formulations, specifically for photoresist removers and strippers. Solvent based strippers are designed to strip photoresist and remove veils from

sidewalls and multiple combinations of residues in wafer processing. Today, unique formulations typically address either bulk photoresist removal or residue removal, though some do both. High solvency, high stability, low volatility, high rinsability, and complete solubility in water are desired system characteristics in photoresist removing and stripping solutions. EastaPure™ DE exhibits these desired properties, thus making it an excellent choice for these semiconductor applications. EastaPure™ DE solvent may also be utilized in edge-bead removal processes after spin coating. Because solvents are the basis for photoresists, solvent systems are utilized in edge-bead remover formulations. Edge-bead removers are specifically formulated to quickly and efficiently remove edge beads that build up during the spin coat process. A Certificate of Analysis (COA) will be provided with each shipment.

Table 1: Special properties Upper limits for trace metals

Component	Upper Limit (parts/billion)
Aluminum (Al)	100
Barium (Ba)	100
Cadmium (Cd)	100
Calcium (Ca)	100
Chromium (Cr)	100
Cobalt (Co)	100
Copper (Cu)	100
Gallium (Ga)	100
Germanium (Ge)	100
Iron (Fe)	100
Lead (Pb)	100

Component	Upper Limit (parts/billion)
Lithium (Li)	100
Magnesium (Mg)	100
Manganese (Mn)	100
Nickel (Ni)	100
Potassium (K)	100
Silver (Ag)	100
Sodium (Na)	100
Strontium (Sr)	100
Titanium (Ti)	100
Zinc (Zn)	100

Table 2: Typical properties

Molecular weight	134.17
Empirical formula	C ₆ H ₁₄ O ₃
Color (Pt-Co scale), max.	10
Wt/vol @ 20°C, kg/L (lb/gal)	0.99 (8.25)
Solubility	
In water, @ 20°C	Complete
Water in, @ 20°C	Complete
Evaporation rate	
(n-Butyl acetate = 1)	0.02
(ether = 1)	605.1
Dilution ratio	
Toluene	1.9
VM&P Naphtha	Immiscible
Refractive index @ 20°C	1.426
Vapor density (air = 1)	4.6
@ 20°C	0.12 mm Hg
55°C	0.49 Kpa
Specific gravity @ 20/20°C	0.99
Boiling point @ 760 mm Hg, °C (°F)	198–204 (388–399)
Freezing point, °C (°F)	–90 (–130)
Flash point, Tag open cup, °C (°F)	96 (205)
Fire point, °C (°F)	96 (205)
Flammability limits in air, % by volume	
Lower @ 135°C	1.2
Upper @ 182°C	23.5
Autoignition Temperature, °C (°F)	204 (400)
Hansen solubility Parameters	
Nonpolar	7.9
Polar	3.8
Hydrogen bonding	6.2
Total	10.7
Surface tension @ 20°C, dynes/cm	32.2
Blush resistance @ 26.7°C (80°F)	76% RH
Electrical resistance, megohms	<0.2
Critical temperature, °C	358.8
Critical pressure, ATM	31
Critical volume, mL/g-mol	420
Expansion coefficient, per °C @ 20°C	0.0009
Heat of vaporization, cal/g-mol	11,170
Heat of combustion, kcal/g-mol	–817.4
Nitrocellulose solubility	Active
Maximum incremental reactivity (MIR)	3.19
Liquid viscosity @ 25°C, cP (mPa-s)	4.5
Liquid heat capacity @ 54°C, cal/g-mol	73

Properties reported here are typical of average lots. Eastman makes no representation that the material in any particular shipment will conform exactly to the values given.

EASTMAN

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Material Safety Data Sheets providing safety precautions, that should be observed when handling and storing Eastman products, are available online or by request. You should obtain and review the available material safety information before handling any of these products. If any materials mentioned are not Eastman products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

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